

Impacts of Dogs on the Foreshore and Nearshore at Blackie Spit Park: Literature Review and Management Options

prepared for

City of Surrey Parks, Recreation and Culture Dept.

prepared by
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EXECUTIVE SUMMARY

The City of Surrey Parks, Recreation and Culture Department (PRC) requested a literature review and management options dealing with the issue of dogs in the nearshore and foreshore areas of Blackie Spit Park in Surrey, BC. The scope of the study was specified by Surrey's Parks, Recreation and Culture Department to include:

- An analysis of existing data on habitats, wildlife use and significance of Blackie Spit Park,
- A summary of PRC data on dog use in the Park,
- A literature review of the effects of dogs on the wildlife of intertidal habitats,
- An examination of management strategies used for off-leash areas (OLAs) in other jurisdictions,
- Interviews with representatives from various interest groups regarding dogs and wildlife in the Park and
- Management options for dogs in the nearshore and foreshore of Blackie Spit Park.

The intertidal areas of the park vary in type and include marsh, mudflats, gravel/cobble beach, tide channels and old dykes. There are two records for rare (blue-listed) plant species in the area: western pearlwort and beach sand-spurry. Blackie Spit Park is located in the lower Fraser River Valley, an area heavily used by migratory birds. The Fraser delta receives bird populations of international importance and ranks among the top eight sites for shorebird abundance in the western hemisphere. Large numbers of shorebirds and waterfowl use Blackie Spit Park, primarily in the spring and fall migration period. Seventy-three different bird species were recorded in the area from October 1999 to May 2003. An average of 6401 birds were seen on each survey, with a maximum of 50,000 birds. Four of the species observed are Red-listed (endangered or threatened) by the BC Conservation Data Centre and eight are Blue-listed (vulnerable). There is relatively little nesting by shorebirds and waterfowl; the park is primarily used for loafing, foraging and roosting during the winter and migratory periods.

Surrey PRC data on dog and human use of Blackie Spit Park was summarised. Lack of standardization, replication and adequate sample sizes precluded extensive analysis, but it was clear that many dogs were off-leash in leash-required areas, and dogs were often observed in the Environmentally Sensitive Area where dogs are prohibited.

Literature on the effects of dogs on wildlife was reviewed and summarized. Birds on migration must accumulate sufficient fat stores to survive the trip. Disturbance that diminishes birds' foraging time may significantly affect their survival on migration. Dogs may disturb wildlife either accidentally or by deliberate chasing. Dogs on-leash disturb wildlife less frequently than dogs off-leash, but actual direct injury or mortality to wildlife by dogs is rare. Flocking birds in open habitats (i.e. beaches) are more vulnerable to disturbance than single birds in dense cover. Birds usually are more sensitive to the approach of dogs than to human beings. Most dog owners ignore bird-chasing by their dogs and only a few attempt to recall their dog. Although dogs are known to disturb birds both actively and passively, there is little hard data regarding the quantitative effects of dog disturbance on the survival or reproductive success of overwintering or migrating birds. However, the absence of data should not be construed as a lack of effect; rather it reflects the extreme logistical

difficulties of controlling the required studies. Studies of the effects of disturbance on wildlife are hampered by the complexity of cause-and-effect relationships and the lack of complete local knowledge. As well, individuals, populations and species vary in their sensitivity to disturbance

A sample of dog management strategies from other jurisdictions (Lower Mainland, other areas in Canada, the US, and other countries) was reviewed. Dog management varies from off-leash except in designated leash-required zones down to a signed code of conduct required from dog owners in order to walk their dogs in park areas. Various forms of zoning, permit fees and seasonal closures are also used.

The bird populations of the Boundary Bay area, of which Blackie Spit is a part, are of international significance. Dog access to the intertidal areas of the Park is not recommended unless the required elements of adequate barrier fencing, enforcement and dog owner education are all in place. All foreshore and nearshore areas of the Park should be considered sensitive. The least-sensitive (most frequently disturbed) areas are relatively small in size and would not support sustained use by large numbers of dogs. The possible presence of a rare plant species on the spit should also be considered if activities resulting in an increase in dog/human foot traffic on the spit are proposed. Consultation and agreement from all user groups would be needed before dog access could be implemented. It is recommended that dog water access be considered at other sites off Blackie Spit Park where sensitive habitat is not involved.

1.0 INTRODUCTION

The City of Surrey Parks, Recreation and Culture Department (PRC) requested a literature review and management options dealing with the issue of dogs in the nearshore and foreshore areas of Blackie Spit Park in Surrey, BC. Blackie Spit Park provides valuable shoreline habitat that is used by thousands of shorebirds and waterfowl, primarily during the migration seasons and over the winter. The park is also a focus for a number of recreational activities including boating, swimming, walking (with or without dogs), bird-watching, and picnicking.

There is a long tradition of off-leash dog-walking in the park by local residents. Although Surrey by-laws require that dogs be leashed when off private property, enforcement is sporadic at best. A trial off leash area (OLA) in the upland areas of the park was instituted in 2002 as per the official park plan and in response to the requests of local dog-owners for an official off-leash dog park. The trial area was closed in 2003 by the Surrey PRC Commission after PRC staff reported that off-leash dogs were consistently observed in the environmentally sensitive and leash-required areas of the park, and that there were incidents of dog aggression on other park users. The report (Englund 2003) stated '*It is clear that the majority of park patrons are in favour of a dog off-leash area in the park. However, despite considerable educational and regulatory enforcement initiatives, off-leash dogs use environmentally sensitive areas, disturb wildlife, and threaten or attack other park patrons. It should be noted that once parks are designated officially as off-leash areas, the information quickly finds its way onto the internet, and into magazines and books, resulting in substantial increases in park use. Should Blackie Spit be officially designated as a dog-off-leash park, detrimental impacts on the foreshore environment can be expected due to overall increased incidents of dogs being off-leash in the restricted area.*'

A survey of park users found that many dog owners asked for access to the water to swim their dogs (City of Surrey PRC data). The City of Surrey then asked for a review of available information on the effects of dogs on the foreshore and nearshore of Blackie Spit Park, and a summary of dog management strategies used in other jurisdictions with similar issues.

1.1 Study Scope

The scope of the study was specified by Surrey's Parks, Recreation and Culture Department to include:

- An analysis of existing data on habitats, wildlife use and significance of Blackie Spit Park,
- A summary of PRC data on dog use in the Park,
- A literature review of the effects of dogs on the wildlife of intertidal habitats,
- An examination of management strategies used for OLAs in other jurisdictions,
- Interviews with representatives from various interest groups regarding dogs and wildlife in the Park and
- Management options for dogs in the nearshore and foreshore of Blackie Spit Park.

The study scope **does not** include the examination of other related issues such as:

-
- The effects of dogs on wildlife in other areas of the park, including the former off-leash trial area
 - The effects of other forms of recreational disturbance (i.e. jet skis) on wildlife
 - The effects of dogs on other park users
 - The benefits to dogs and dog walkers of access to the intertidal and to water
 - Additional collection of field data on dog or wildlife use of Blackie Spit
 - Evaluation of any specific management plan prepared by stakeholders.

Although the scope of our review did not include the effects of human recreation on wildlife, we have included a number of studies that also document wildlife responses to pedestrians and or/ recreationists. Unless a study is examining stray or feral dogs, it is rarely possible to separate the effects of dogs on wildlife from the effects of the human handlers accompanying dogs. Human beings with or without dogs disturb wildlife, and this must also be considered when assessing the impacts of dog-walking.

2.0 STUDY AREA AND EXISTING MANAGEMENT

Blackie Spit Park is located in the City of Surrey on the southwest corner of Mud Bay. The park borders Boundary Bay at the mouth of the Nicomekl River (Figure 1). The park consists of Blackie Spit and the upland areas south and west of the spit. The area was officially designated as a park in 1997 (Berris and Associates, and Dillon Consulting Ltd.1999). Park facilities include pedestrian trails, a swimming club, tennis courts, parking areas, and a sailing club with boat ramp. The sailing club and other boaters make frequent use of the intertidal areas near the clubhouse to launch small sailing craft.

The Blackie Spit Park Master Plan, approved by the Surrey Parks, Recreation and Culture Commission, includes the following objectives for the park (Berris and Associates, and Dillon Consulting Ltd. 1999):

- Provide a park with the predominant character of a nature park
- Protect environmentally sensitive resources such as special habitats, unique vegetation, birds, other wildlife and fish species and cultural resources
- Provide opportunities for passive recreational use, interpretation and education
- Support community uses within the park, including the swimming club, sailing club and community gardening activities
- Organize facilities to better define use patterns and to minimise the potential for conflicts between facilities/activities and natural resources.

The City of Surrey's management strategy for natural areas and recreation (Ward *et al.* 2001) includes the following principles designed to guide the development of management goals and objectives, preparation of work plans, and resolution of associated issues:

- Natural areas are valuable ecosystems and must be respected
- Wildlife must be protected
- Natural areas are for the benefit of the general public and should be shared
- Fragmentation of natural areas must be limited when providing access

-
- Recreational activities must be compatible with the site and must not unduly impact significant habitats and vegetation
 - Recreational activities on the same site must be compatible with one another
 - Access and recreation activities must be legitimate and authorized
 - Access and recreation should be planned, monitored, and evaluated
 - Regulations designed to protect natural areas should be developed and enforced.

The management strategy (Ward *et al.* 2001) also included recommendations for developing dog off-leash facilities in natural areas, which included:

1. Develop facilities in natural areas of low environmental sensitivity.
2. Segregate off-leash facilities to reduce conflicts.
3. Consult with the general public and other stakeholders prior to the development of dog parks.
4. Consult with other cities and organizations that have developed dog parks.
5. Fence dog parks.
6. Design dog parks to prevent overuse.
7. Ensure adequate parking.
8. Provide adequate signage and educational pamphlets.
9. Provide proper disposal facilities for excrement.
10. Encourage the development of dog park associations and volunteer groups.
11. Develop effective regulations and ensure uniform enforcement.

The City of Surrey's Parks, Recreation and Culture Commission policy manual on natural areas (City of Surrey PRC 2002) further states:

- Park natural areas should provide opportunities for residents to access and enjoy nature without compromising the integrity and health of the natural areas
- Park natural areas are important contributors to local, regional and global biological diversity and will be managed to enhance biodiversity
- Management programs shall be implemented to protect, conserve and enhance native fauna
- Activities shall be compatible with the natural area, with each other and shall not impact significant habitats and vegetation
- Activities shall be legitimate and authorized.

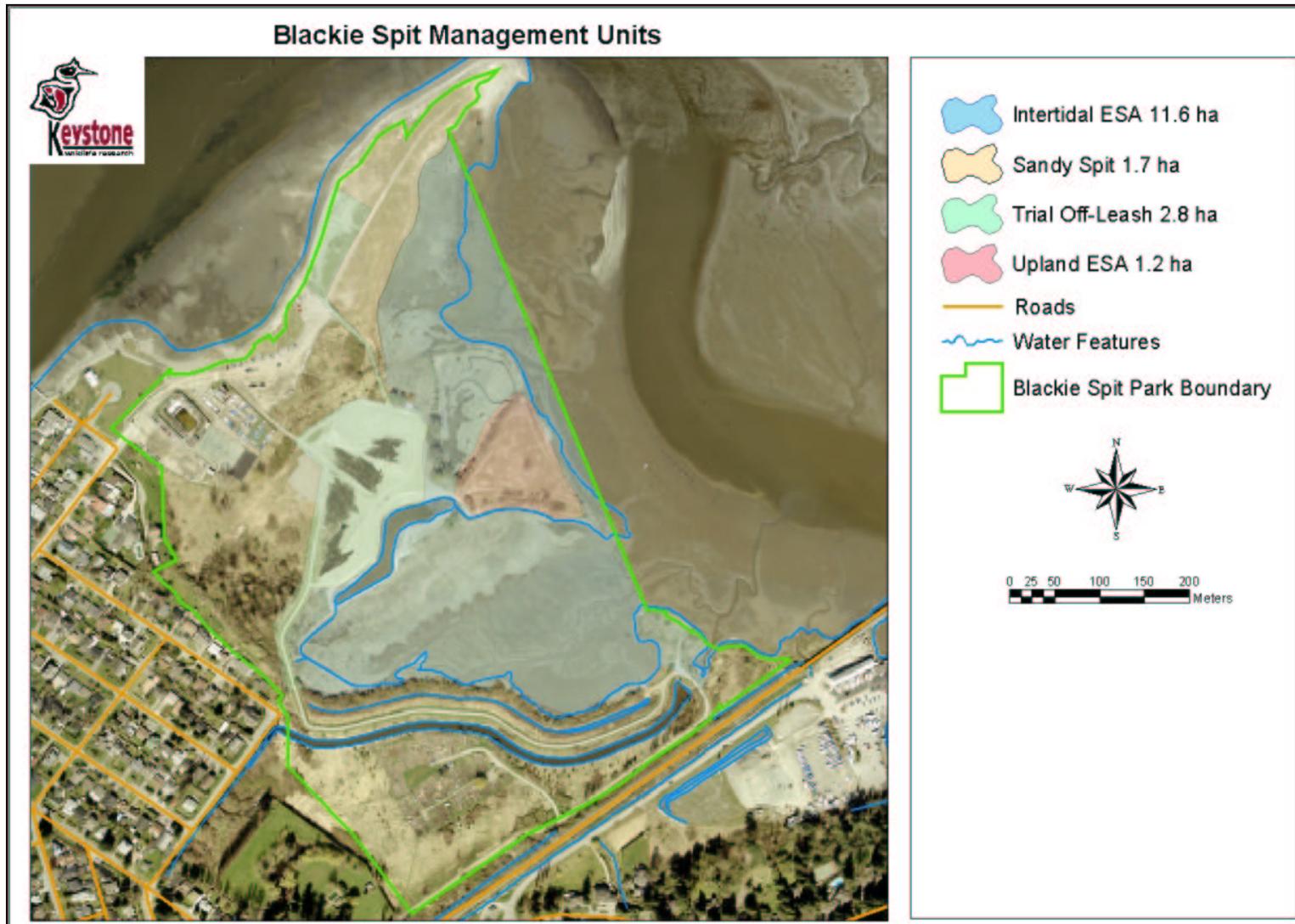


Figure 1. Foreshore and nearshore areas assessed in Blackie Spit Park.

2.1 Habitat

Blackie Spit Park includes 'some of the most sensitive, fragile habitats that remain in the Lower Mainland – salt marsh and brackish marshes, mudflats and tidal channels (J. Evans, MWLAP, pers. comm.). The intertidal areas of the park vary in type and include marsh, mudflats, gravel/cobble beach, tide channels and old dykes (Catherine Berris Associates Inc. 1999; Figures 2 and 3). The following descriptions have been taken from the Blackie Spit Wildlife Habitat Enhancement Plan (Summers 2001).



Figure 2. Beach area near sailing club.



Figure 3. Mudflats at the mouth of the Nicomekl River.

The intertidal areas of the park have been designated Management Unit 1. MU1-north is composed of muddy substrate over sand, sparsely vegetated by American glasswort (*Salicornia virginica*), sea arrow-grass (*Triglochin maritimum*), saltgrass (*Distichlis spicata*) and orache (*Atriplex patula*). MU1-Central is a salt marsh dominated by saltgrass and glasswort. MU1-South is a bay that includes mudflat and brackish estuarine marsh vegetation. Glasswort, salt grass, grasses and mud rush (*Juncus gerardii*) are the main species.

MU 14 consists of the sandy spit, and has been designated open habitat for migratory passerine birds. The spit has four main habitat types including three vegetated types (Sea rocket/silver burweed, sparse grass/shrub, and dense grass/forb/shrub) on the more upland areas and bare sand with a fringe of dunegrass (*Elymus mollis*) on the beach. The east side of the spit is highly environmentally sensitive, and the west side is used as an impromptu dog swimming area (Berris and Associates and Dillon Consulting Ltd. 1999).

2.2 Rare Plant Species on Blackie Spit

The BC Conservation Data Centre provided information on rare species records for Blackie Spit Park (BC Conservation Data Centre pers. comm.). There are two records for rare plant species: western pearlwort and beach sand-spurry. The blue-listed western pearlwort (*Sagina*

decumbens ssp. *occidentalis*) was recorded in 1915, and its location given only as 'Crescent'. The blue-listed beach sand-spurry (*Spergularia macrotheca* var. *macrotheca*) was recorded in 1979 near the path on Blackie Spit.

2.3 Wildlife Use

Blackie Spit Park is located in the lower Fraser River Valley, an area heavily used by migratory birds. Up to 1.4 million birds have been counted in the region on a single day and several millions more stop through the year (Butler 2000; Butler and Cannings 1989). The Fraser delta receives bird populations of international importance and ranks among the top eight sites for shorebird abundance in the western hemisphere. Boundary Bay exceeds the criteria for international importance on several conservation schemes (Butler 2000).

Bird populations in the Fraser Delta peak in October, November and December when migrant Dunlin and duck numbers are at their highest (Butler and Cannings 1989). Many shorebirds and ducks continue to move farther south but large populations spend the winter in the delta. Populations rise again during spring migration. Most birds have departed by May and the delta populations remain low through September except during the July migration of Western and Least Sandpipers. Mud Bay is a particularly important area for Dunlin, Northern Pintails and Great Blue Herons (Figure 4) (Butler and Cannings 1989).



Figure 4. Great Blue Herons frequently use Blackie Spit Park (RJ Hobson photo).

The habitats of Blackie Spit Park provide valuable feeding and loafing areas for wildlife, especially birds. Large numbers of shorebirds and waterfowl use the park, primarily in the spring and fall migration period. There is relatively little nesting by shorebirds and waterfowl; the park is primarily used for loafing, foraging and roosting during the winter and migratory periods (J. McKenzie, pers. comm.). The numbers and types of birds using the intertidal zones are dependent on the weather and the tide. Shorebirds generally rest or 'loaf' in open areas with good visibility at high tides. When the tide goes out, the birds forage down near the waterline, and then return with the rising tide.

Dabbling ducks mostly use the nearshore areas of the park, sometimes in numbers over a thousand (Summers 2001), while divers forage in the offshore areas. Shorebirds such as Dunlin and dowitchers feed at the waterline at low tide. Waterfowl also use the sheltered areas of the park to wait out bad weather (J. McKenzie, pers. comm.). The mouth of the Nicomekl River is particularly important to Black-bellied Plovers (R. Butler, CWS, pers. comm.).

The BC Coastal Waterbird Survey provided data on bird species, numbers and use of the Blackie Spit/Crescent Beach area. The data set is not complete and has not yet been checked for errors. Data were recorded during monthly walks from Blackie Spit through Crescent Beach during mid-tide periods with good visibility (J. McKenzie, pers. comm.). Surveys were not done during the summer months.

Seventy-three different bird species were recorded in the area from October 1999 to May 2003 (Table 1), including eight raptor species, 18 species of shorebird and 25 waterfowl (ducks and geese) species. It is not known how many of the species in Table 1 were observed on the intertidal areas of Blackie Spit Park as opposed to the other habitats/areas on the BC Coastal Waterbird Survey transect. Four of the species observed are Red-listed (considered endangered) by the BC Conservation Data Centre (BC Species and Ecosystems Explorer 2003), and eight are Blue-listed (considered vulnerable). One species, Peregrine Falcon, is either Red-listed or Blue-listed depending on the subspecies of the individual(s) observed. The Conservation Data Centre has a record of another blue-listed species, Green Heron, observed with young on Blackie Spit in 1979, 1983 and 1987, but this species has not been recorded recently (BC Conservation Data Centre, pers. comm.). Four of the blue-listed species in Table 1, Great Blue Heron, American Golden-Plover, Short-Billed Dowitcher and California Gull, are known to be particularly sensitive to the presence of walkers and their dogs (Butler 2000).

Table 1. Bird species recorded by the BC Coastal Waterbird Survey for Blackie Spit/Crescent Beach from Oct. 1999 to May 2003.

Species Code	Species Name	Species Status (Provincial)
AGPL	American Golden-Plover	Blue
AMCO	American Coot	Yellow
AMWI	American Wigeon	Yellow
BAEA	Bald Eagle	Yellow
BAGO	Barrow's Goldeneye	Yellow
BBPL	Black-Bellied Plover	Yellow
BEKI	Belted Kingfisher	Yellow
BLSC	Black Scoter	Yellow
BOGU	Bonaparte's Gull	Yellow
BRAN	Brant	Yellow
BRCO	Brandt's Cormorant	Red
BUFF	Bufflehead	Yellow
CAGO	Canada Goose	Yellow
CAGU	California Gull	Blue
CANV	Canvasback	Yellow
CATE	Caspian Tern	Blue
CMTE	Common Tern	Yellow

Species Code	Species Name	Species Status (Provincial)
COGO	Common Goldeneye	Yellow
COHA	Cooper's Hawk	Yellow
COLO	Common Loon	Yellow
COME	Common Merganser	Yellow
COMU	Common Murre	Red
DCCO	Double-crested Cormorant	Red
DUNL	Dunlin	Yellow
EAGR	Eared Grebe	Yellow
EUWI	Eurasian Widgeon	Yellow
GADW	Gadwall	Yellow
GBHE	Great Blue Heron	Blue
GRSC	Greater Scaup	Yellow
GRYE	Greater Yellowthroat	Yellow
GWGU	Glaucous-winged Gull	Yellow
GWTE	Green-winged Teal	Yellow
HADU	Harlequin Duck	Yellow
HOGR	Horned Grebe	Yellow
HOME	Hooded Merganser	Yellow
KILL	Killdeer	Yellow
LBCU	Long-billed Curlew	Blue
LBDO	Long-billed Dowitcher	Yellow
LESA	Least Sandpiper	Yellow
LESC	Lesser Scaup	Yellow
LEYE	Lesser Yellowlegs	Yellow
LTDU	Long-tailed Duck	Blue
MAGO	Marbled Godwit	Yellow
MALL	Mallard	Yellow
MEGU	Mew Gull	Yellow
MERL	Merlin	Yellow
NOHA	Northern Harrier	Yellow
NOPI	Northern Pintail	Yellow
NOSL	Northern Shoveler	Yellow
OSPR	Osprey	Yellow
PALO	Pacific Loon	Yellow
PBGR	Pied-billed Grebe	Yellow
PEFA	Peregrine Falcon	Red/Blue**
PGPL	Pacific Golden-Plover	Yellow
RBGU	Ring-billed Gull	Yellow
RBME	Red-breasted Merganser	Yellow
REKN	Red Knot	Yellow
RNGR	Red-necked Grebe	Yellow
RTHA	Red-tailed Hawk	Yellow
RTLO	Red-throated Loon	Yellow
RUDU	Ruddy Duck	Yellow
SAND	Sanderling	Yellow
SBDO	Short-billed Dowitcher	Blue
SEPL	Semi-palmated Plover	Yellow
SNGO	Snow Goose	Yellow
SSHA	Sharp-shinned Hawk	Yellow
SUSC	Surf Scoter	Blue
THGU	Thayer's Gull	Yellow
WEGR	Western Grebe	Red
WESA	Western Sandpiper	Yellow
WHIM	Whimbrel	Yellow
WWSC	White-winged Scoter	Yellow

Species Code	Species Name	Species Status (Provincial)
YBLO	Yellow-billed Loon	Yellow

* Yellow = Not at risk, Blue = Vulnerable, Red = threatened/endangered.

** Status depends on subspecies

The most numerically abundant species using the area are American Wigeon, Green-winged Teal, Greater Scaup, Northern Pintail, White-winged Scoter, Dunlin, and Black-bellied Plover. An average of 6401 birds were seen on each survey, with a maximum of 50,000 birds (mostly shorebirds) recorded during a particularly productive tide in 2000 (Figure 5). Boundary Bay has recently been nominated for inclusion as a hemispheric site (over 500,000 shorebirds) in the Western Hemisphere Shorebird Reserve Network (R. Butler, CWS, pers. comm.).

Shorebirds appear to be in decline in Canada. Morrison *et al.* (2001; as cited in Donaldson *et al.* 2000) assessed population trends for 35 species of shorebirds across Canada, based on available data from a number of survey programs. Overall, of the 35 species of shorebirds covered by the analyses, 28 (80%) were negative: this includes 17 species with statistically significant declines somewhere in their range and two showed persistent negative trends. During the migration and wintering periods, shorebirds are often limited geographically to only a few accessible suitable habitats, which are often traditional sites that may be critical to the well-being of particular shorebird flocks (Burger 1986; R. Butler, CWS, pers. comm.). Coastal habitats of selected shorebird and waterfowl species that use Blackie Spit Park have been summarized in Table 2.

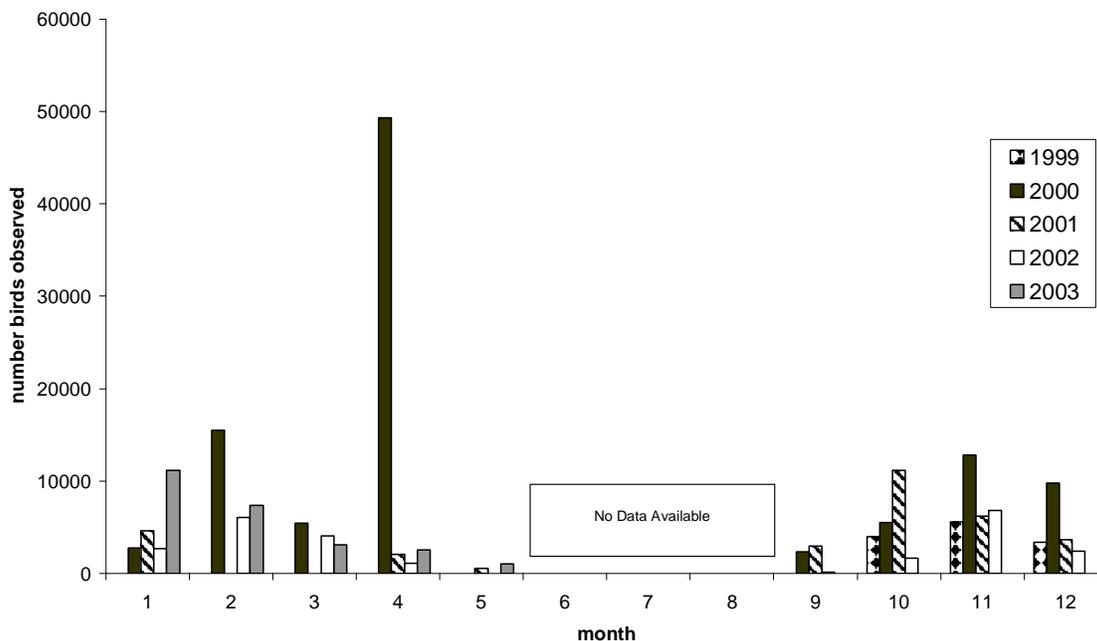


Figure 5. Bird numbers* observed on Blackie Spit/Crescent Beach.

*note that data for 2003 is incomplete (Jan-May only).

Table 2. Coastal habitats of selected shorebirds and waterfowl using Blackie Spit Park (From Campbell *et al.* 1990 a, b).

Species	Coastal Habitats
American Golden-Plover	Lagoon shores, sand spits, tidal mudflats, rocky beaches, upland habitats
American Wigeon	Estuaries, mudflats, lagoons, shallow bays with eelgrass, sloughs and marshes
Barrow's Goldeneye	Bays, harbours, inlets
Black-Bellied Plover	Tidal mudflats, sandy beaches, rocky islets, rocky beaches, short-grass uplands
Black Scoter	Estuaries, bays, harbours with shallow waters
Bufflehead	Bays, harbours, lagoons, estuaries
Canvasback	Estuaries, saltwater lagoons,
Caspian Tern	Beaches, tidal mudflats, sheltered bays
Common Tern	Bays, estuaries, harbours, lagoons, narrows and beaches
Common Goldeneye	Estuaries, bays, harbours, lagoons
Dunlin	Tidal mudflats, spits, dykes, log booms, breakwaters, sandy beaches, rocky points
Eurasian Widgeon	Estuaries, protected coves with eelgrass
Gadwall	Estuaries, brackish and freshwater marshes, mudflats, flooded fields
Greater Scaup	Estuaries, inlets, bays and harbours
Green-winged Teal	Tidal mudflats
Harlequin Duck	Open water, exposed rocks and reefs
Killdeer	Tidal mudflats, sand spits
Long-billed Curlew	Tidal mudflats and beaches
Long-billed Dowitcher	Tidal mudflats, offshore rocks, islands, log booms
Least Sandpiper	Tidal mudflats and estuaries
Lesser Scaup	Harbours, estuaries, saltwater lagoons, inlets, sloughs
Lesser Yellowlegs	Sheltered bays, estuaries, tidal mudflats, sandy or muddy beaches
Long-tailed Duck	Open waters, estuaries, mudflats
Marbled Godwit	Sandy beaches, tidal mudflats, lagoons, nearshore rocks
Northern Pintail	Tidal marshes, shallow foreshore waters, estuaries, exposed eelgrass beds, mudflats, farm fields
Northern Shoveler	Shallow bays, estuaries, marshes
Pacific Golden-Plover	Lagoon shores, sand spits, tidal mudflats, rocky beaches, upland habitats
Red Knot	Mudflats, sandy beaches, offshore rocks, sand dunes, freshwater sloughs
Ruddy Duck	Sloughs and marshes
Sanderling	Sandy beaches
Short-billed Dowitcher	Tidal mudflats, muddy fields, offshore rocks
Semi-palmated Plover	Tidal mudflats, sandy and gravel beaches, estuaries, rocky beaches
Western Sandpiper	Tidal mudflats, sandy beaches, estuaries
Whimbrel	Offshore islets and rocks, mudflats, sandy beaches, beach dunes

The shoreline areas of Blackie Spit Park and the mouth of the Nicomekl River also provide habitat for juvenile salmonids and beach invertebrates (shellfish, Dungeness and red rock crabs). We were unable to locate information on the effects of dog disturbance on these wildlife types. Mammals such as racoons (*Procyon lotor*) and coyotes (*Canis latrans*) also

use the foreshore and nearshore of the park occasionally but use by these species is expected to be minimal due to the lack of escape cover. Harbour seals have been sighted on the park shorelines but dog disturbance is not expected to be significant to this species.

2.4 Human/Dog Use

Surrey PRC collected data on visitor and dog use of Blackie Spit Park from 2000-2003. The surveys were not standardized for weather or time of day. Total survey time in minutes was not recorded. The surveys took place during the winter months, though the months and days when surveys took place were not consistent from year to year (Table 3). The surveys in 2000-2002 recorded 488 people and 277 dogs (the 2003 surveys did not record the total number of people or dogs).

Table 3. Months sampled in the Surrey PRC visitor/dog survey dataset.

Year	No. Days sampled	Months Sampled
2000	8	Dec
2001	12	Nov, Dec.
2002	24	Feb, Mar, Nov, Dec
2003	6	Jan

Dogs in the park were frequently off-leash outside of the trial OLA. The percent compliance with dog leash regulations ranged from 13% on the dyke to 100% in the parking lot (Table 4), however, it must be noted that sample sizes were very variable.

Table 4. Percent compliance with on-leash regulations in various areas of Blackie Spit Park. Numbers in brackets indicate sample size (total number of dogs recorded).

Year	dyke	parking lot	spit	other on-leash areas
2000	no data	no data	no data	52% (29)
2001	13% (15)	63% (8)	25% (56)	no data
2002	no data	100% (2)	64% (25)	0% (10)

Dogs on and off-leash were recorded in the ESA where dogs are prohibited (Table 5). It is difficult to draw conclusions from this data given the variation in observation period length, observation period timing, and sample size.

Table 5. Numbers of dogs (on and off-leash) seen in the ESA (dogs prohibited) during Surrey PRC survey periods.

Year	No. Days sampled	# Dogs seen in ESA
2000	8	6
2001	12	9
2002	24	12
2003	6	6

Dog owners frequently swim their dogs off the west side of the spit (Figure 6), though this is officially a leash-required area. During a field visit on a weekday morning in mid-August, the west side of the spit was constantly occupied by a series of single dog owners each

swimming one dog. Multiple dog tracks were also noted in the ESA. Only a single pile of dog feces was observed (in the former trial OLA), confirming Surrey PRC staff's reports that most dog owners do clean up after their pets.



Figure 6. Dog owners swim their dogs in the on-leash area on the western side of the spit.

3.0 EFFECTS OF DOGS ON WILDLIFE OF THE INTERTIDAL ZONE

The effects of dogs on wildlife may be divided into two categories (Chester 2001):

- Direct effects including injury or death of wildlife from contact with dogs
- Indirect effects including loss of foraging opportunities, exclusion from preferred habitats and heightened stress levels from disturbance.

Dogs are rarely directly lethal to birds, so their impacts must be viewed in terms of cumulative impacts on reproduction and survival (Lafferty 2000).

The effects of dogs on wildlife and its habitat are greatly reduced if dogs are leashed (Harlock Jackson Pty Ltd. 1995; Lafferty 2001b). However, disturbance can occur even if dogs are leashed, and individual dog owners vary greatly in their compliance with leash laws. The influences of dogs on wildlife have been separated into direct and indirect effects based on the literature review.

3.1 Direct Effects on Wildlife

Many dogs have a highly-developed chase instinct and will pursue wildlife at any opportunity (Didon 2003). Some wildlife is especially vulnerable to dog predation including the young, injured or ill. Slow-moving wildlife such as crabs are also at risk. Nests, especially those of ground-nesting birds such as Mallards, are targets for depredating dogs that may eat or break eggs. Although many publications cite the possibility of wildlife being killed or injured (Birds Australia 2002; City of Boulder, CO. 2003; County of Sonoma 2003; Lafferty 2000) and the potential for dog predation on wildlife is obvious, there are few data available regarding the extent of dog predation and its significance. The information available deals mainly with stray/feral dog predation on ungulates such as deer and mountain sheep (National Park Service 2003; Joslin and Youmans 1999) and is not particularly applicable to the situation at Blackie Spit Park.

3.2 Indirect Effects on Wildlife

Indirect effects include disturbance and habitat degradation. Each effect is considered in more detail below.

General Effects of Disturbance

The impacts of the presence of people, and the effects of particular types of human activity on shorebirds, have rarely been examined (Burger 1986). Birds generally respond to disturbance in three different ways (Burger 1986). They either remain on the beach (but may run away from the source of disturbance), fly up but return to the original site, or fly away entirely. If the birds are required to fly several times in a short period, they move to another location (Boyle and Samson 1985). When disturbance causes a bird to desert a particular site, the availability of suitable alternate sites is critical for the bird's survival (Saunders *et al.* 2000). Lafferty (2001a) reports that Snowy Plovers stopped breeding (but continued to winter) at a particular beach concurrent with the opening of beach access to humans. After three decades of increasing recreational use of the beach, the plovers permanently abandoned the site for wintering.

Chronic, cumulative disturbance could reduce shorebird reproduction and survivorship (Lafferty 2001b). Wildlife in general has limited budgets for energy expenditure. They must find their own food and shelter while avoiding predators and accumulating enough stored energy for costly activities such as reproduction, migration, or weathering cold temperatures. Shorebirds congregate at staging areas such as Boundary Bay to fatten up for migration. Frequent harassment means that birds will use more energy and require more food. If food or food availability is limited, population declines will result (Birds Australia 2002). Often, staging areas are traditionally used and individual birds will return to a particular area every year. A bird may visit a migration staging area for two weeks, double its weight in that time, then set out on its journey again and lose that weight in a matter of 50-60 hours (Harrington 1995).

There are very few data on the actual energetic costs of disturbance (Lafferty 2001a). Although it is evident that flying and re-landing several times an hour requires energy, it is not known for certain whether the energy expenditure is significant enough to actually affect bird survival or reproductive success. Harrington (1996) studied shorebirds at staging areas in Massachusetts. Birds were captured, weighed and banded for future identification. Harrington found that 80-85% of the heavy birds came back to the staging area in successive years, but only 30% of the lightweight birds returned next year. He suggested that the lighter weight birds had insufficient energy reserves to make it over the ocean to their wintering grounds in South America. Using the average distance that a Red Knot flies when disturbed, the flight speed on migration, the bird's weight and typical wing length, Harrington calculated that a Red Knot disturbed 20 times a day would consume about 25% of the fat that it otherwise would have gained for use in its migration flight. Shorebirds unsuccessful at gaining necessary fat reserves have very low survival rates (Brown *et al.* 2000).

Burger (1993) found that in areas with low levels of human disturbance, shorebirds spent nearly 70% of their time foraging and 30% avoiding people or predators. In areas with higher human disturbance, the time spent avoiding people increased and shorebirds foraged less than 40% of their time – a decrease in food consumption combined with an increase in energy expenditure. Shorebird foraging activity is often concentrated at low tide. Disturbance during peak foraging times may thus exact a greater energetic cost to the birds in terms of loss of opportunities to forage when food is most abundant and available (Burger 1986). A single disturbance incident at the wrong time may deter birds from feeding until the next tidal cycle (Fox *et al.* 1993).

The effects of disturbance vary greatly between different species of bird and depend upon the size and characteristics of the water body and the availability of alternative sites. Overwintering and breeding birds are particularly susceptible to disturbance (Saunders *et al.* 2000). Burger (1986) found that few shorebirds in two coastal bays in the northeastern US remained when disturbed during late May to late July. Most flew to adjacent beaches or flew away entirely. Individual birds may habituate to repeated disturbance while others become increasingly nervous (Elliot *et al.* 1998). Disturbance is least likely to permanently displace gulls and terns. Ducks usually move a short distance while herons, egrets and shorebirds are most likely to be displaced greater distances (Burger 1981). Burger (1986) recommended that beaches with high shorebird populations should be off-limits to dogs, joggers and unattended children during periods of high shorebird use.

There is a lack of information in the literature documenting long-term effects of disturbance on wildlife communities (Miller 1999). Wildlife may habituate to disturbance if it is predictable (e.g. hikers always on a trail) and no actual harm results to the animals from the disturbance (eg. aircraft overhead, Miller 1999).

Effects of Disturbance by Dogs

Dog disturbance of wildlife is opportunistic and is associated with the concentration of wildlife in a given area (Jones and Stokes 1977). The rate at which dogs disturb wildlife at a particular site may be affected by several factors including:

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- The number of dogs using the site
 - The numbers and types of wildlife using the site
 - The behaviour of the dogs, especially how well they were controlled by their handlers
 - The distance that dogs travel from their handler
 - Physical characteristics of the site including terrain, visibility and vegetation.

The effects of disturbance by dogs on wildlife can vary with the wildlife species, season, habitat type and the dogs' behaviour. Dogs travelling quietly along a trail with screening vegetation on both sides are unlikely to disturb or even encounter wildlife. Cole (1989) considered the impacts of dogs in backcountry (i.e. forested) habitats to be of only low to moderate importance, but Hatch (1996; cited in Lafferty 2000) classified 'pets' as a high-impact activity for wintering plovers. Playing fetch with a dog in a natural open space designated as providing wildlife habitat can be very disturbing (Ridge to Rivers Trail System 2003).

Additional evidence that the effects of disturbance may vary seasonally was recorded by Lafferty (2001a). Wintering Western Snowy Plovers reacted to disturbance at half the distance (40 m) that was reported for breeding Snowy Plovers (80 m). Humans, dogs, crows and other birds were the main sources of disturbance on the public beach studied by Lafferty, with 23-28% of the dogs on the beach disturbing plovers at a rate of 26-73% of the roosting birds per disturbing dog. A higher proportion of the dogs than humans disturbed plovers. The numbers of dogs in a group did not significantly alter the probability of a disturbance. The majority of dog disturbance occurred when dogs were within 30 m of the plovers. Lafferty used focal observations of individual birds to determine that plovers flew relatively little in response to other birds (21%) and humans (28%), an intermediate amount in response to dogs (36%) and horses (40%) and most in response to crows (61%). The plovers did not appear to significantly acclimate to high rates of disturbance.

Lord *et al.* (2001) examined the effects of human approaches to nests of New Zealand Dotterels (*Charadrius obscurus aquilonius*). Three types of approaches were made: walking, running and leading a dog. Leading a dog caused the greatest disruption of incubation, providing evidence that shorebirds perceive dogs as posing more of a threat than human beings on foot, and that their subsequent avoidance response is greater. There was some evidence that nesting birds habituated to frequent disturbance, although it is not known if birds that were frequently disturbed had similar reproductive success to those that were infrequently disturbed. The authors recommend that human activity in general, and dog walking in particular, be limited near Dotterel nesting sites.

Studies of Brant in Boundary Bay and Parksville found that 31% of 281 disturbances of Brant were caused by dogs (Martin and Nygren 1991, cited by Butler 2000). Brant were more responsive to the presence of dogs than humans and departed to about twice the distance when disturbed by dogs as when disturbed by humans. The area of beach unused by Brant around a dog was about four times larger than the area unused around a human being.

Forty percent of dogs disturbed birds on a California beach and more than 70% of birds flew away when disturbed (USGS 2001). When Snowy Plover breeding areas were fenced to

prevent disturbance by pedestrians and dogs, plover density inside the fence doubled. The number of Least Terns within the fenced area increased six-fold. Counts of birds outside the fence remained largely unchanged. Hatch (1996, cited in Lafferty 2000) considered that chasing by off-leash pets was the most significant recreational disturbance for wintering snowy plovers.

Dr. Jamie Smith (Faculty of Zoology, UBC) studied nesting Song Sparrows in brushy areas of Burns Bog and found that no sparrow nests failed due to dog disturbance despite high numbers of dogs using the area (J. Smith, pers. comm.). He did not observe any instances of dogs chasing sparrows but found that dogs tended to ignore the small birds.

Off-leash dogs and their handlers were studied in Boulder, Colorado by Bekoff and Meaney (1997). They found that off-leash dogs generally did not travel far off-trail and rarely were observed to chase other dogs, disturb people, chase wildlife, destroy vegetation or enter bodies of water. Abraham (2001) compared dog disturbance to wildlife in two protected areas in California. Wildlife was flushed by 34-41% of the dogs passing through one park, while only 20% of dogs passing through the other park flushed wildlife. Abraham noted that there was a sharp distinction between those dogs that were well controlled by their owners and those that were not, and attributed the differences in flush rates between parks to the different abundance of wildlife between them.

Fawkes (2001) conducted a review of six ground-nesting bird species inhabiting open heaths and mires in the New Forest in Britain, where dog-walking is a frequent pastime. He noted that there was no evidence that dogs off-leash but under control have had any adverse effect on the nesting success of the six species considered. He recommended that dogs not be prohibited altogether but that sensitive sites be zoned off-limits to both dogs and pedestrians. Thomas *et al.* (2003) conducted studies of foraging behaviour of Sanderlings (*Calidris alba*) on two central California beaches. They found that the number and activity of people on the beach significantly affected the amount of time Sanderlings spent foraging. The most significant negative factor was the presence of free-running dogs on the beach. The authors recommended that people (with or without dogs) maintain a minimum distance of 30 m from shorebird concentration areas and that leash laws be strictly enforced.

The GVRD collected observational data on dog-walkers and dogs in individual regional parks (GVRD 2000a). The percentage of dogs observed chasing wildlife ranged from 0 –100%, with the percentages generally <5%. Observations in Boundary Bay Regional Park included: 1) 33% of dogs off leash, and 2) 13% of dogs chasing wildlife (flocks of feeding birds mentioned specifically; whether the dogs in question were on or off leash was not recorded). Dogs were observed in the water and uprooting beach and dune vegetation by digging.

Gerst (2002) also collected data on dog disturbance to wildlife in Boundary Bay Regional Park. She found that disturbance rates increased with the number of dogs in a visitor group, with one dog disturbing wildlife 14% of the time, two dogs disturbing wildlife at 24%, and three or more dogs disturbing wildlife at 31%. Disturbance rates between two dogs and three or more dogs were not significantly different. Overall, dogs disturbed wildlife at a rate of 15%. About 38% of the total dogs observed were leashed, with 62% off-leash. Only 2% of

leashed dogs disturbed wildlife compared to 25% of off-leash dogs. The majority of dogs (62%) were on-trail, with the remainder (38%) off-trail. As percentages of dogs off-trail increased, wildlife disturbance rates increased. The rate of disturbance to wildlife increased with the distance between the dog and its handler. Observable disturbance to wildlife was very low at distances of 2 m or less from dog to handler. Waterfowl were disturbed with greatest frequency (38% of observations), followed by gulls and terns (32%), passerines (27%) and shorebirds (25%). Most disturbances occurred when a dog accidentally flushed wildlife (55%), but active chasing also occurred (34%) and dogs were observed to injure but not kill wildlife on two occasions. In most cases of dogs disturbing wildlife, their handlers ignored the incident (69%). Some watched their dog disturb wildlife (12%) or encouraged their dog (8%), but only 6% attempted to recall their dogs. Most (51%) of disturbed wildlife flew or moved away and did not return. Wildlife returned to the scene of disturbance in 34% of incidents.

Piping Plovers on the East Coast of the US react at twice the distance and are displaced twice as far by dogs as they are by pedestrians (US Fish and Wildlife Service 1996, cited in Lafferty 2001a). Sensitivity of shorebirds to dogs may result from previous experiences of being chased or because birds instinctively view dogs as predators (Gabrielsen and Smith 1995, cited in Lafferty 2001a). Snowy Plovers were sensitive even to dogs that did not chase them and responded substantially more frequently and intensely to people with pets than to people alone (D. Hatch, pers. comm. cited in Lafferty 2000). Incidents of dogs chasing plovers lasted up to 20 minutes and could be observed several times an hour, with in most cases the owner making no attempt to call or restrain their dog(s) (Meeker 1996, cited in Lafferty 2000). Birds are unlikely to habituate to dog disturbance because dog disturbance is unpredictable and represents an actual physical threat. Dogs commonly run up and down the beach in an irregular zig-zag fashion (Burger 1986), whereas human walkers and joggers tend to move in straight lines.

Habitat Degradation

Degradation of habitat is most prevalent in small OLAs where there is heavy dog use (Kane 2001). Both dog and human traffic compact the soil and crush vegetation. Dogs also enjoy digging. This is unlikely to have significant effects on the unvegetated areas of the intertidal but could contribute to degradation of the vegetated areas. The blue-listed beach sand-spurry has been recorded on the spit and trampling by people and dogs could affect the species' persistence and/or habitat.

3.3 Summary of Literature Review

The issue of dogs, especially off-leash dogs, in wildlife habitat causes much controversy (Crowley 2002; McCarthy no date; Gustaitis 1998; McAllister 2002). Although dogs are known to disturb birds both actively and passively, there is little hard data regarding the quantitative effects of dog disturbance on the survival or reproductive success of overwintering or migrating birds. However, the absence of data should not be construed as a lack of effect; rather it reflects the extreme logistical difficulties of controlling the required studies. Studies of the effects of disturbance on wildlife are hampered by the complexity of cause-and-effect relationships and the lack of complete local knowledge. As well, individuals, populations and species vary in their sensitivity to disturbance (Boyle and Samson 1985). A tabular summary of the results of the literature review is presented in Table 6.

Table 6. Summary of information from literature review.

Known	Unknown/no data
<ul style="list-style-type: none">• Boundary Bay, including Blackie Spit, is a site of international importance for migratory birds• Migratory birds must gain sufficient weight to survive migration and overwintering• Birds that are frequently disturbed spend less time feeding• Dogs can disturb wildlife by active chasing or by simply being present in wildlife habitat, on or off-leash• Dogs are capable of capturing and killing migratory birds, but this happens rarely• Repeated disturbances (from any source) can cause migratory birds to abandon an area	<ul style="list-style-type: none">• Dog disturbance (excluding other sources of disturbance) to overwintering or migrating birds affects their survival and/or reproductive success• Birds forced to move to alternate areas suffer decreased survival and/or reproductive success.

4.0 DOG /WILDLIFE MANAGEMENT IN OTHER JURISDICTIONS

Dog management strategies vary by jurisdiction. Some allow off-leash dogs during specific time periods, and some allow dogs only in specific areas. Many jurisdictions specify the degree of control required for off-leash use. The ‘scooping’ rule, however, seems universal. Recommended etiquette for off-leash areas has been publicized in a number of places (Kain 2003; Kane 2001).

It has been suggested that it may be in the best interest of environmental organisations to assist dog clubs and city authorities to locate and establish dog exercise parks and dog swimming areas in locations not highly used by wildlife. In this way, wildlife habitat is protected while the demand for off-leash dog areas is met (Crowley 2002). If enough areas

are provided for off-leash use where the potential for disturbance is low, the likelihood of off-leash dogs in sensitive areas will probably be reduced.

4.1 Dogs in Other Areas of BC

A BC Parks brochure states that migrating shorebirds are particularly sensitive to dogs and advises that dogs should not be brought to beaches with shorebirds (BC Parks no date). The BC Interim Wildlife Guidelines for Commercial Recreation (BC MWLAP) do not consider dog disturbance in depth but suggest that dogs should be leashed and not allowed within 250 meters of nesting habitats from May to August. Dogs must be leashed within Canadian National Parks, including the beaches of Pacific Rim National Park, but are prohibited altogether in the Broken Islands group (Parks Canada 2002) due to general concerns about wildlife disturbance.

The GVRD has undertaken a 2-year pilot dog management project within Pacific Spirit Park, beginning in 2002 (Cooper 2002). The 73 km of upland trails in the park are used by hikers, cyclists, and equestrians, as well as commercial and recreational dog-walkers. The pilot program is currently ongoing and will end on December 31, 2003. There is insufficient information at present to assess the success of the project (R. Wallis, GVRD, pers. comm.). However, GVRD staff have begun issuing citations instead of warnings in an effort to increase compliance in on-leash areas.

Pacific Spirit Park rules include (GVRD 2002):

- Dog handlers must carry a collar and leash for each dog
- A maximum of 3 dogs to 1 handler (unless a commercial dog-walking permit is purchased)
- Dogs must be leashed when horses are approaching
- Dogs must be leashed within 10 m of streams
- Dogs (and people) are prohibited from the Fraser Estuary Ecological Reserve
- Dogs are prohibited from the foreshore/beach during summer months when smelt spawn
- An off-leash area is provided on Spanish Banks Beach West for year-round use
- Trails are designated as 'on-leash', or 'leash optional'
- Some trails are 'leash optional' on weekdays but 'on-leash' on weekends and holidays.

The GVRD has also published tips for canine etiquette (GVRD 2003) that include not allowing dogs to approach, chase or attack wildlife.

The GVRD organized an inter-municipal work group on dog management in parks (GVRD 2001). They prepared a set of principles and guidelines for dog management in public parks. The guidelines related to wildlife habitat include:

- access for dogs in parks should be permitted if the plant associations, faunal communities and natural values are not adversely compromised
- dogs should not be permitted in areas where threatened or endangered plants or animals are present

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- dog-free areas should be designated to protect sensitive environmental areas and provide trails and areas where patrons can feel safe and be without fear of dogs
 - municipal park off-leash areas should be at least the size of a soccer field (= 6720 m²)
 - environmentally sensitive areas, including stream corridors, water bodies, wildlife habitat, fragile vegetation (including ornamental plantings) should be avoided or provided with effective barriers to separate use
 - no off-leash opportunities should be developed near threatened and endangered species or habitats if dog use poses threats to those species or habitats.
 - in the absence of data on which to base decisions, the precautionary principle should be applied.

Other recommendations made by the GVRD project were to devise fair, realistic and enforceable leash by-laws, as the public only respects rules when they are enforced. One GVRD employee commented that the three 'E's – Education, Enforcement and Engineering – were vital to a successful dog management program (R. Wallis, GVRD, pers. comm.). Fencing of environmentally sensitive areas such as salmon streams has proven to be effective at preventing dog access in Pacific Spirit Park. Enforcement has been constant, with a person hired to patrol the park with her dog and educate dog owners seen behaving irresponsibly. Park staff report that having a dog accompany the patrol has made a great deal of difference on how the educational message is received by dog owners (R. Wallis, GVRD, pers. comm.).

4.2 Dogs in Other Provinces

The establishment of dog OLAs is a rapidly growing practice in many Canadian provinces. In 2001, OLAs were present in BC, Nova Scotia, Alberta, Quebec, Ontario, Manitoba and Saskatchewan (Kane 2001). However, the majority of beaches in the US and Canada do not allow pets (Kain 2003).

The city of Edmonton has off-leash parks for dogs but requires that they be on-leash in other public areas (City of Edmonton 2003). Fines may be issued for dogs that are off-leash as well as for dogs that are not under control. Dog parks are still considered multi-use areas and dog patrons are urged to respect other users. Dog handlers are requested to leash dogs when wildlife is present.

Point Pelee National Park in Ontario is world-famous as a birding hotspot. Dogs are permitted in the park (except for group campgrounds) but must be on a leash not more than 3 metres in length.

4.3 Dogs in other Countries

The City of Boulder, Colorado has allowed dog off-leash areas in its Open Space and Mountain Parks (OSMP) network (City of Boulder, CO 2003). Dog-walking is termed an acceptable passive recreation opportunity on OSMP lands, but limitations to specific locations and specific conditions on the level of dog control are deemed appropriate because the activity can cause significant conflicts with other visitors and some significant resource impacts. The city has provided a great deal of public information in terms of signage and

brochures describing proper off-leash etiquette. Criteria for determining whether an off-leash area dog is 'under control' are specified and include:

- The dog must immediately return to its handler when called, regardless of distractions
- The dog must never chase or act aggressively to wildlife, other dogs or human beings
- The dog must not approach other human beings unless invited and must not 'behave in a way that any person may find harassing or disturbing' (City of Boulder, CO. 2002).

Dogs are also required to be leashed within 100 feet of a designated trailhead, and prohibited from highly sensitive natural areas. Infraction of the rules is punishable by a fine of up to \$1000 and/or 90 days in jail. Although the rules are specified, in practice, they are very difficult for parks staff to enforce and a small minority of irresponsible dog owners continue to cause significant problems (D. Sutherland, pers. comm.). Dog-related issues and conflicts are the most common visitor use concerns with which OSMP staff contend. One OLA at a local lake includes a fenced-in area that extends into the lake where dogs are allowed to swim (inside the fenced area only). City of Boulder staff (D. Sutherland, pers. comm.) report that 'massive fecal and urine contamination of the lake' makes the community's kayak recreation training at the lake an unpleasant experience. Based on their own experience, Boulder city staff strongly recommend that off-leash dogs not be permitted in parks with significant wildlife values (D. Sutherland, pers. comm.).

Guidelines for dog owners using beach areas have been assembled by the City of San Diego (2003). Two designated Leash Free exercise areas are in place, and dogs are generally allowed on beaches after 6 p.m. from April 1st to October 31st or after 4 p.m. from November 1st to March 31st. Dogs must be licensed and must be leashed unless in the designated Leash Free areas.

The regulations for Point Isabel Regional Shoreline near San Francisco permit dog owners to unleash their dogs (except for pit bulls) as long as owners carry a leash, keep their dog in sight and under voice control and immediately leash any dog that shows aggressiveness to people or to other animals (East Bay Regional Park District 2003). The City of Boise has adopted similar rules in a pilot dog off-leash project (Ridge to Rivers Trail System 2003). Several trails in the city reserves have been designated as 'Controlled Off-leash Areas' where dogs can be off-leash as long as they remain within 30' of their handler and do not approach or harass people, pets or wildlife. Boise's pilot program is ongoing and no decisions have been made regarding its permanent implementation.

The US National Park Service is currently developing a pet management strategy for Golden Gate National Recreation Area (USD National Parks Service 2002). Currently, blanket regulations governing all national parks require that all pets (where allowed at all) must be crated, caged or restrained at all times. The Golden Gate National Recreation Area Citizen's Advisory Committee recommended the establishment of 'voice control' areas within several parks in 1979, and these unofficial areas were used as off-leash sites for more than 20 years. In 1993, the Western Snowy Plover was listed as threatened in the US under the federal Endangered Species Act. The NPS began enforcing leash regulations within a 2.2 mile stretch of beach used by the plovers in an attempt to limit disturbance to the birds (Gustaitis

1998). Some dog owners challenged the regulations. The Citizen's Advisory Committee admitted that the 'voice control' policy was null and void as it conflicted with already-established NPS regulations and NPS staff began enforcing the leash laws at other park sites. Dog owners protested vocally and new pet management regulations are under development at this time. NPS will *'not willingly authorize park uses that would cause negative or adverse impacts unless it has been fully evaluated, appropriate public involvement has been obtained, and a compelling management need is present. In those situations, the Service will ensure that any negative or adverse impacts are the minimum necessary, unavoidable, cannot be further mitigated, and do not constitute impairment of park resources and values'*. The new management policy under consideration includes:

- Prohibition of dogs within designated environmentally sensitive areas
- Requirement that dogs must be on leash and remain on trails
- Identification of specific areas where dogs may be off leash.

At present, estimates of leash compliance within the plover beach management areas range from 20-50% (Gustaitis 1998).

Some beach areas used by Snowy Plovers in California have been prohibited to off-leash dogs. With education and posting, but without enforcement, 10% of handlers leashed their dogs at Ocean Beach (Hatch 1996, cited in Lafferty 2001a), 7% were leashed along a Critical Habitat Area at Devereaux and 21% were leashed in the Devereaux plover roost (Lafferty 2001a). Posting and a moderate enforcement presence (15% of daylight hours) brought compliance with the leash law to 30% at Vandenberg Air Force Base, and full time enforcement at Ocean Beach brought compliance to near 100% because pet owners moved their activity to adjacent beaches lacking enforcement (Hatch 1996, cited in Lafferty 2001a).

Other management actions taken to protect plover beaches in California include 'symbolic' rope fencing of important areas, guarded by volunteer 'plover wardens' who intercept visitors and off-leash dogs (Lafferty 2000). Prohibiting dogs altogether and closing beaches to the public have also been used, although 30% of users at one beach entered a posted closed area (Fahy and Woodhouse 1995, cited in Lafferty 2000).

The San Francisco Dog Owners Group (SFDOG) disagrees with the establishment of fenced off-leash areas and prefers that park users share San Francisco's park space with dogs under voice control (SFDOG no date). SFDOG recommends that dog off-leash zone capacity be calculated as 400 square feet (37 m²) per one dog. The organization does not consider dog disturbance of wildlife a problem and limits its guidelines regarding wildlife to the placement of signs in sensitive areas, and the leashing of dogs that are disturbing wildlife.

Permits are required to bring dogs onto Fort Lauderdale's Canine Beach (City of Ft. Lauderdale 2003). A permit is \$15.90 annually or \$5.30 for a weekend. Dogs must be leashed and are restricted to the hours between 3-7 p.m. on Friday, Saturday and Sunday. Dog handlers are required to carry their permit at all times. Dogs in Joshua Tree National Park are restricted to a leash not more than 6 feet in length and are prohibited on trails and beyond 100 feet from legally open roads and campgrounds (National Park Service 2003).

Off-leash dogs and/or their interaction with natural predators were determined to be the primary causes of Piping Plover chick mortality at plover breeding beaches at Cape May Point State Park in New Jersey (NJ Dept. of Environmental Protection 2000). Dogs entering the refuge areas frightened adult birds off their nests and predators took the unprotected chicks. Previous protection measures of erecting fencing, placing predator exclosures over nests, restricting sunbathing and picnicking in nesting areas and educating beach visitors were unsuccessful at protecting chicks. The New Jersey Department of Environmental Protection responded by prohibiting dogs on park beaches from April 15 through September 15.

The city of Fort Collins, CO, has always prohibited off-leash dogs in its natural areas but as the law was not enforced until recently, dog owners became used to allowing their dogs to run free (City of Fort Collins, CO 2001). After extensive problems from off-leash dogs, patrolling rangers began educating dog owners and giving warnings to those with dogs off-leash. Signage was installed and enforcement gradually increased over the next four years. Park rangers began using a field-accessible database to allow them to track whether persons encountered in the field had received previous warnings. In 2001, after continuing complaints of off-leash dogs chasing wildlife, the city announced a 'no tolerance' policy regarding off-leash dogs. Any violators of the leash laws will receive citations.

Portland Department of Parks and Recreation requires that dogs in parks be leashed unless in a designated off-leash area (Portland Parks and Recreation 2003). Unleashed dogs are never allowed in natural areas (wildlife habitats, lakes, ponds, streams) and are strictly prohibited from chasing wildlife and from digging holes. Infractions of the rules are punishable by fines of up to \$150, however, the information on their website suggests that enforcement is limited due to budgetary constraints.

Trial off-leash areas were introduced in 1991 in Eugene, Oregon (Eugene, Oregon Parks Department 1997). Five sites around the city, all within larger parks, were chosen as trial areas. Support for the off-leash parks was strong and after the public hearings at the end of the trial, it was decided to retain all five locations. City staff recommend that dog park sites be large enough to handle dog and dog-walker traffic without becoming muddy and degraded, have sufficient parking, and be fenced with gates at entry points. Dog parks within smaller neighbourhood parks may not be feasible if they are too small and/or too close to adjacent residences. Clean-up facilities (bags, refuse cans with lids) should also be provided.

The degree of dog access to American beaches is very variable (Boraczek no date). Unless on designated 'dog beaches', dogs are allowed on the Cape Cod National Seashore on leash only, all year round. However, they are restricted from nature trails, bathing beaches and shorebird nesting areas from May 15 to October 15. Dogs are allowed on Duxbury Beach, MA, on leash or other effective control, from May 1 to Sept. 15 (with some specific area restrictions). Dewey Beach, DE, allows dogs from 5:30 p.m. to 9:30 am year round, but a \$3 license is required. New Jersey allows dogs on beaches in State and National Parks as long as they are on a 6-foot leash.

Dog management in public open spaces became a hot topic for some time in the city of Banyule in Melbourne, Australia (Jackson 1997). After consultation with dog owners, sports clubs, non-dog owners, and recreationists, the city implemented by-laws allowing dogs off-leash (but under control) in parks and open spaces except those where they were required to be on-leash. Environmentally-sensitive parks and reserves were designated as on-leash access only. Dogs were determined to be 'under effective control' if they were within 75 m of their handler and would return to the handler when called. It was also suggested that the city council commit to the installation of more dog toilets and to an extensive education campaign.

Birds Australia (2002) recommends closing selected beaches with high bird use during the pre-migration season, and providing buffer zones between beach areas dedicated to recreation and those dedicated to wildlife habitat. Appropriate signage explaining management actions and encouraging responsible beach use is also recommended.

Cape Peninsula National Park in South Africa has prepared a 'contractual' document between park management and dog walkers to facilitate responsible dog walking in the park (Cape Peninsula National Park & Friends of the Dog Walkers 2002). A system of area zoning has been implemented with dogs prohibited from sensitive areas, but allowed on-leash in some areas and off-leash in others. Temporary restrictions or closures are put in place around bird nesting sites, notably nesting birds on beaches. All park users are required to purchase a 'Go Green' Card and sign a Code of Conduct for the activity in which they are participating, including dog walking. Dog walkers unable to produce a Go Green card will be fined or asked to leave the park. A maximum of four dogs is permitted per handler without special permission. Dogs must be leashed when the handler sees indigenous wildlife, and must be under control at all times.

Dog regulations clearly vary a great deal between jurisdictions (summarized in Table 7). A number of jurisdictions report problems with compliance of leash regulations, and others report the burgeoning popularity of designated off-leash areas either within existing parks or as dedicated developments.

Table 7. Summary of a sample of dog regulations from other countries.

City/Country	Park/Beach	Dog Regulations
Boulder, CO, USA	Open Space network	<ul style="list-style-type: none"> • Designated off-leash areas • Dogs must remain under control • Dogs must be leashed within 100 feet of a trailhead • Dogs prohibited from sensitive habitats • Fines up to \$1000 for infractions
San Diego, USA	City beaches	<ul style="list-style-type: none"> • Designated off-leash areas • Leashed dogs allowed on other beaches with time and seasonal restrictions
Boise, ID, USA	Ridge to Rivers Trail System	<ul style="list-style-type: none"> • Leash optional on some trails (pilot program) • Dogs must not approach or harass other dogs, people or wildlife

City/Country	Park/Beach	Dog Regulations
CA, USA	Point Isabel Regional Shoreline	<ul style="list-style-type: none"> • Dogs allowed off-lead (except for pit bulls) • Owners must carry leash and leash dogs who misbehave • Dogs must remain in sight and under voice control
CA, USA	Golden Gate National Recreation Area	<ul style="list-style-type: none"> • On-leash only (currently under review)
CA, USA	Ocean Beach, Devereaux	<ul style="list-style-type: none"> • Leash required in posted plover nesting areas
USA	Joshua Tree National Park	<ul style="list-style-type: none"> • On-leash only (6 foot) • Dogs prohibited on trails and beyond 100 feet from roads and campgrounds
Ft. Lauderdale, USA	Canine Beach	<ul style="list-style-type: none"> • Purchased permit required • On-leash only • Time and day restrictions
NJ, USA	Cape May Point State Park	<ul style="list-style-type: none"> • Dogs prohibited from beaches from April 15-Sept. 15
Fort Collins, CO, USA	Natural areas	<ul style="list-style-type: none"> • On-leash only; no-tolerance policy
Portland, OR, USA	City Parks	<ul style="list-style-type: none"> • Leash required unless in designated OLA
Eugene, OR, USA	City Parks	<ul style="list-style-type: none"> • Dog OLAs within city parks
USA	New Jersey State and National Parks	<ul style="list-style-type: none"> • Dogs allowed on 6-ft leash only
USA	Dewey Beach	<ul style="list-style-type: none"> • Dogs allowed from 5:30 pm to 9:30 am • \$3 license required
USA	Duxbury Beach	<ul style="list-style-type: none"> • On leash only; seasonal
USA	Cape Cod National Seashore	<ul style="list-style-type: none"> • On leash only, year round • No access to nesting beaches during nesting season
Banyule, Australia	Public spaces	<ul style="list-style-type: none"> • Off leash except in designated leash-required areas • On-leash only in sensitive habitats • Dogs must remain within 75 m of handler and come when called
South Africa	Cape Peninsula National Park	<ul style="list-style-type: none"> • Dog walking fee required • Signed code of conduct required • Dog number limit • Area zoning • Temporary closures of bird nesting sites

5.0 DOG MANAGEMENT OPTIONS FOR THE BLACKIE SPIT INTERTIDAL ZONE

Blackie Spit Park's foreshore and nearshore contains habitat of international importance for overwintering and migrating birds. The conservation of these habitats and minimising disturbance to the birds using them are mentioned as priorities in both the Blackie Spit Park Master Plan and its Habitat Enhancement Plan (Summers 1991). Guidance from other jurisdictions suggests that dog OLAs are not appropriate near sensitive wildlife habitats. There is great demand for a site near Crescent Beach/Mud Bay where dogs can swim and

play in the water. Given the high demand and high numbers of dogs and dog owners likely to use beach access for dogs, it is questionable whether an area the size of Blackie Spit can sustain the level of use that would result from an official dog beach.

Previous experience in Blackie Spit Park and in other jurisdictions suggests that even moderate compliance with leash regulations in environmentally sensitive areas is rarely achievable without:

- frequent enforcement,
- dog owner education including prominent and well-spaced signage, and
- well-maintained fencing completely separating OLAs from sensitive habitat.

Beach access for dogs in Blackie Spit Park is not recommended in any areas unless all three of those conditions can be met.

Fencing is a useful tool for managing dogs and wildlife (Mahon 2003). Either the OLAs or the sensitive wildlife areas may be fenced. Fencing free-running areas prevents dogs from accessing other parts of the park and there is some evidence that fencing can diminish human disturbance to birds by providing areas of refuge within highly visited habitats (Ikuta and Blumstein 2003). Fencing for dog areas should be at least 1.2 m in height with self-closing gates, designed to blend into the natural surroundings in the park. Double gates are recommended to prevent escapes (AKC 2003). The necessary budget must be available to rigorously maintain the fencing and promptly repair damage due to vandals or weather. As fences may obstruct flying birds, the White Rock-Surrey Naturalists or the Canadian Wildlife Service should approve the design of any fencing used. The existing fence around the tidal pod ESA is a good start, but the absence of both a self-closing gate and a prominent sign prohibiting dog access limit its effectiveness (Figure 7).



Figure 7. Lack of a self-closing double gate limits the effectiveness of fencing around the ESA.

Education is one of the keys to successful OLAs. Creative use of educational signs can be effective in boosting compliance to on-leash regulations in environmentally sensitive areas (Norfolk Coast AONB 2003). The current signs identifying environmentally sensitive shoreline areas in Blackie Spit Park are few in number and do not adequately cover the site.

Although all of the shore and beach portions of the park are useful to wildlife, the beach and boat ramp areas near the sailing club are the least sensitive as they are already frequently disturbed by human beings (R. Butler, CWS, pers. comm., J. McKenzie, pers. comm.). If the conditions of fencing and enforcement can be met, these sites may offer potential for dog swimming access. However, both sites are relatively small and would not be suitable for large numbers of dogs. If the site is too crowded, dog owners will be tempted to move to more sensitive parts of the park. One of the complaints received about the trial OLA was that it was too small for the numbers of dogs that sometimes used it (City of Surrey PRC data).

The adjacent road and parking lot pose further dangers to dogs on the beach unless a dog-proof fence is installed. There is also the potential for conflict with other park users such as the sailing club. The beach in front of the sailing club is currently prohibited to dogs during the summer months as it is considered suitable for human bathing use. Fecal contamination of nearby human-use beaches is also a potential problem, but Parks staff note that dog owner compliance with clean-up regulations in Blackie Spit Park is generally good (L. Englund, Surrey PRC, pers. comm.). Consultation and agreement from all user groups would be needed before dog access could be implemented.

Dog owners have suggested that the west side of the spit serve as a dog swimming area, and that location is currently used for this purpose, despite the existing by-law prohibiting dogs on beach areas during summer months. Although the west side of the spit is less sensitive than the east side, options for preventing dog access to the east side are limited. Dog-proof, double-gated fencing down the spit would be an intrusive element and one not likely to be approved by other park users. The west side of the spit is also the only area where other park users can stroll on clean sand at the water's edge, and conflicts with dogs would seem to be unavoidable. High foot traffic (both people and dogs) resulting from an OLA would result in trampling and disturbance of vegetation on the higher areas of the spit. There is an occurrence record for a blue-listed plant species at the base of the spit, although it is not known if the plant still grows in the area. The remaining areas of shoreline within the park are highly sensitive. Their muddy nature makes them unsuitable as dog OLAs from both a wildlife perspective and the perspective of dog owners who would have to clean up their animals.

In summary, Blackie Spit Park is not a good candidate for dog access to the intertidal due to the high sensitivity and regional importance of its habitats, the relatively small size of the less-sensitive habitats, and the need for extensive, expensive and intrusive fencing to prevent off-leash dogs from accessing other areas of the park (Table 8). The dog management option that is eventually chosen for implementation within the Park should also include well-spaced signs that clearly indicate the dog management regulations and the area to which they apply. Any designated OLAs should also include a sign publicizing dog etiquette.

Dog walkers form a legitimate user-group asking for consideration within the City of Surrey's park structure. The City of Surrey, the local dog owners group, and naturalists' organisations should come together to identify a suitable alternate site outside Blackie Spit Park for a dog OLA (ideally with water access and other amenities for dogs) that does not have high environmental values (Figure 8). A dedicated dog park with highly-desired facilities such as drinking water, benches and sturdy, permanent, dog agility structures would attract a high degree of use and diminish conflict between dog use and wildlife values. Suitable sites for OLAs should be easily accessible by vehicle and by foot, be securely fenced with double gates, offer a separate fenced area for exercise of small, elderly or infirm dogs, and provide cleanup facilities (plastic bags and covered disposal cans). Dog clubs should be encouraged to assist with funding for the alternate OLA(s) by seeking corporate donations and by offering assistance with building and maintaining dog agility structures.

Table 8. Summary of options for dog access to intertidal areas in Blackie Spit Park.

Management Option	Advantages	Disadvantages
No dog access to intertidal	<ul style="list-style-type: none"> • most effective option to limit dog-related disturbance to wildlife 	<ul style="list-style-type: none"> • requires adequate signage and enforcement to be effective • should be paired with identification of a nearby alternate area (outside of Blackie Spit Park) for a replacement OLA with water access
Dog access to water on west side of spit only	<ul style="list-style-type: none"> • provides opportunity for dog-walkers to recreate with dogs • allows for physical separation of dog off-leash activity from other forms of recreation and from areas more heavily-used by wildlife 	<ul style="list-style-type: none"> • requires fencing, signage, education and enforcement • fencing will likely be target of vandalism and aesthetic concern to other park users • potential for conflict with other users • potential to affect blue-listed plant species by trampling • contrary to existing by-law prohibiting dogs from beaches during summer months • conflicts with recommendations in Master Plan for undisturbed intertidal habitat • area is too small to support sustained use by many dogs
Dog access to water at boat ramp area only	<ul style="list-style-type: none"> • provides opportunity for dog-walkers to recreate with dogs • allows for physical separation of dog off-leash activity from areas heavily-used by wildlife • places dog activity in an area already heavily disturbed by people • dogs not required to go through sensitive habitats to reach the beach 	<ul style="list-style-type: none"> • requires fencing, signage, education and enforcement • potential conflicts with boat ramp users • proximity to parking lots and vehicle traffic may be hazardous • well-maintained fencing is required • conflicts with swimming beach • area too small to handle large numbers of dogs



Figure 8. Dog owners need a place to take their dogs where sensitive wildlife and habitat are not threatened.

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